Hoku Materials, Inc.
One Hoku Way
Pocatello, Idaho 83204

RECEIVED
APR 01 2008
By REG-DEQ

March 17, 2008

Mr. Bill Rogers
Department of Environmental Quality
Air Quality Division
Stationary Source Program
1410 North Hilton
Boise, Idaho 83706-1255

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APR 02 2008
Department of Environmental Quality
State Air Program

**Re: Request for Pre-Permit Construction Approval Application
Hoku Materials, Inc. 4,000 Mton/yr Plant Expansion**

Dear Mr. Rogers:

Enclosed is a pre-permit construction approval application addressing Hoku Materials, Inc. proposal to build up to a 4,000 Mton/yr polysilicon production plant in Pocatello, Idaho. Hoku Materials is requesting DEQ process this application in accordance with the 15-day pre-permit construction approval process contained in IDAPA 58.01.01.213. As required in IDAPA 58.01.01.213.01a., the permit to construct application is being submitted concurrently with this pre-permit construction request.

The enclosed pre-permit construction approval application has been prepared in accordance with DEQ's January 2001 guidance document "Pre-permit Construction Approval Guidance Document." On February 26, 2008 Hoku Materials and JBR Environmental Consultants, Inc. held a meeting with DEQ to discuss that a request for pre-permit construction approval would be forthcoming. Also, in accordance with the requirements for a 15-day pre-permit construction approval, Hoku Materials has advertised in the Idaho State Journal on March 24, 2008 an invitation to attend a public information meeting to be held at the Holiday Inn Pocatello in Pocatello, Idaho on April 4, 2008 at 12:00 pm.

This project meets the eligibility requirements for pre-permit construction approval because the proposed facility is a minor source and does not plan to utilize emission offsets or netting, and the emissions from the facility are unlikely to impact Class I air quality related values. This satisfies the requirement that a certified proof of pre-permit construction eligibility must be submitted with the pre-permit construction approval application in accordance with IDAPA 58.01.01.213.01.

This submittal includes the PTC application, a modeling section that demonstrates compliance with all applicable air quality rules, detailed emission calculations for the proposed facility, and a copy of the newspaper announcement for the public information meeting. Additionally, this submittal contains an electronic copy of the modeling files that support this application and the $1,000 PTC application fee.

In accordance with IDAPA 58.01.01.213.01.d, I hereby certify that the Hoku Materials, Inc. facility will comply with any restrictions it has imposed on potential to emit such that emissions will be below major source levels, including emission limitations, operating limitations, and monitoring and reporting requirements.

Pursuant to IDAPA 58.01.01.123, I hereby certify that, based on information and belief formed after reasonable inquiry, the statements and information in this application are true, accurate, and complete.

Please feel free to myself at 808.682.7800 or Daniel Heiser of JBR Environmental Consultants at 208.853.0883 if you have any questions or need additional information.

Sincerely,

Karl Taft
Chief Technology Officer
Hoku Materials, Inc.

Enclosures

STATE OF IDAHO
DEPARTMENT OF
ENVIRONMENTAL QUALITY

1410 NORTH HILTON, BOISE, ID 83706 · (208) 373-0502

C. L. "BUTCH" OTTER, GOVERNOR
TONI HARDESTY, DIRECTOR

March 17, 2008

Chris Johnson
JBR
Boise, Idaho

RE: Modeling Protocol for Proposed Modifications to the Hoku Scientific Polysilicon Facility Located in Pocatello, Idaho

Chris:

DEQ received your dispersion modeling protocol on March 10, 2008. The modeling protocol was submitted on behalf of Hoku. The modeling protocol proposes methods and data for use in the ambient impact analyses of a Permit to Construct application for modifications to the Hoku Scientific Polysilicon Facility located in Pocatello, Idaho.

The modeling protocol has been reviewed and DEQ has the following comments:

> Comment 3: Documentation and Verification of Stack Parameters. The application should provide documentation and justification for stack parameters used in the modeling analyses, clearly showing how stack gas temperatures and flow rates were estimated. In most instances, applicants should use typical parameters, not maximum temperatures and flow rates. If the application does not clearly indicate how values for parameters were measured or calculated, even through previous applications provided such information, the application will be determined incomplete. Each application must be complete in itself, providing documentation and justification for data and methods used.

DEQ's modeling staff considers the submitted dispersion modeling protocol, with resolution of the additional items noted above, to be approved. It should be noted, however, that the approval of this modeling protocol is not meant to imply approval of a completed dispersion modeling analysis. Please refer to the *State of Idaho Air Quality Modeling Guideline*, which is available on the Internet at http://www.deq.state.id.us/air/permits_forms/permitting/modeling_guideline.pdf, for further guidance.

To ensure a complete and timely review of the final analysis, our modeling staff requests that copies of all modeling input and output files are submitted with an analysis report. If you have any further questions or comments, please contact me at (208) 373-0112.

Sincerely,

Kevin Schilling

Kevin Schilling
Stationary Source Air Modeling Coordinator
Idaho Department of Environmental Quality
208 373-0112

This checklist is designed to aid the applicant in submitting a complete pre-permit construction approval application.

I. Actions Needed Before Submitting Application

☒ Refer to the Rule. Read the Pre-Permit Construction requirements contained in IDAPA 58.01.01.213, Rules for the Control of Air Pollution in Idaho.

☒ Refer to DEQ's Pre-Permit Construction Approval Guidance Document. DEQ has developed a guidance document to aid applicants in submitting a complete pre-permit construction approval application. The guidance document is located on DEQ's website (go to http://www.deq.idaho.gov/air/permits_forms/permitting/ptc_prepermit_guidance.pdf

☒ Consult with DEQ Representatives. Schedule a meeting with DEQ to discuss application requirements before submitting the pre-permit construction approval application. The meeting can be in person or on the phone. Contact DEQ's Air Quality Permit Coordinator at (208) 373-0502 to schedule the meeting. Refer to IDAPA 58.01.01.213.01b.

☒ Schedule Informational Meeting. Schedule an informational meeting before submitting the pre-permit construction approval application for the purposes of satisfying IDAPA 58.01.01.213.02.a. The purpose for the informational meeting is to provide information about the proposed project to the general public. Refer to IDAPA 58.01.01.213.01.c.

☒ Submit Ambient Air Quality Modeling Protocol. It is recommended that an ambient air quality modeling protocol be submitted to DEQ at least two (2) weeks before the pre-permit construction approval application is submitted. Contact DEQ's Air Quality Modeling Coordinator at (208) 373-0502 for information about the protocol.

☒ Written DEQ Approved Protocol. Written DEQ approval of the modeling protocol must be received before the pre-permit construction approval application is submitted. Refer to IDAPA 58.01.01.213.01.c.

II. Application Content

Application content should be prepared using the checklist below. The checklist is based on the requirements contained in IDAPA 58.01.01.213 and DEQ's Pre-Permit Construction Approval Guidance Document.

☒ Pre-Permit Construction Eligibility and Proof of Eligibility. Pre-permit construction approval is available for minor sources and for minor modifications only. Emissions netting and emissions offsets are not allowed to be used. A certified proof of pre-permit construction eligibility must be submitted with the pre-permit construction approval application. Refer to IDAPA 58.01.01.213.01.

☒ Request to Construct Before Obtaining a Permit to Construct. A letter requesting the ability to construct before obtaining the required permit to construct must be submitted with the pre-permit construction approval application. Refer to IDAPA 58.01.01.213.01.c.

☒ Apply for a Permit to Construct. Submit a Permit to Construct application using forms available on DEQ's website at http://www.deq.idaho.gov/air/permits_forms/forms/ptc_general_application.pdf. Refer to IDAPA 58.01.01.213.01.a.

☒ Permit to Construct Application Fee. The permit to construct application fee must be submitted at the time the original pre-permit construction approval application is submitted. Refer to IDAPA 58.01.01.224.

☒ Notice of Informational Meeting. Within ten (10) days after the submittal of the pre-permit construction approval application, an information meeting must be held in at least one location in the region where the stationary source will be located. The information meeting must be made known by notice published at least ten (10) days before the information meeting in a newspaper of general circulation in the county in which the stationary source will be located. A copy of this notice, as published, must be submitted with the pre-permit construction approval application. Refer to IDAPA 58.01.01.213.02.a.

☒ Process Description(s). The process or processes for which pre-permit construction approval is requested must be described in sufficient detail and clarity such that a member of the general public not familiar with air quality can clearly understand the proposed project. A process flow diagram is required for each process for which pre-permit construction approval is requested. Refer to IDAPA 58.01.01.213.01.c.

☒ Equipment List. All equipment that will be used for which pre-permit construction approval is requested must be described in detail. Such description includes, but is not limited to, manufacturer, model number or other descriptor, serial number, maximum process rate, proposed process rate, maximum heat input capacity, stack height, stack diameter, stack gas flowrate, stack gas temperature, etc. All equipment that will be used for which pre-permit construction approval is requested must be clearly labeled on the process flow diagram. Refer to IDAPA 58.01.01.213.01.c.

☒ Scaled Plot Plan. It is recommended that a scaled plot plan be included in the pre-permit construction approval application and must clearly label the location of each proposed process and the equipment that will be used in the process.

☒ Proposed Emissions Limits and Modeled Ambient Concentration for All Regulated Air Pollutants. All proposed emission limits and modeled ambient concentrations for all regulated air pollutants must demonstrate compliance with all applicable air quality rules and regulations. Regulated air pollutants include criteria air pollutants (PM_{10}, SO_x, NO_2, O_3, CO, lead), toxic air pollutants listed pursuant to IDAPA 58.01.01.585 and 586, and hazardous air pollutants listed pursuant to Section 112 of the 1990 Clean Air Act Amendments (go to http://www.epa.gov/ttn/atw/188polls.html). Describe in detail how the proposed emissions limits and modeled ambient concentrations demonstrate compliance with each applicable air quality rule and regulation. It is requested that emissions calculations, assumptions, and documentation be submitted with sufficient detail so DEQ can verify the validity of the emissions estimates. Refer to IDAPA 58.01.01.213.01.c.

☒ Restrictions on a Source's Potential to Emit. Any proposed restriction on a source's potential to emit such that permitted emissions will be either below major source levels or below a significant increase must be described in detail in the pre-permit construction approval application. Refer to IDAPA 58.01.01.213.01.d.

☒ List all Applicable Requirements. All applicable requirements must be cited by the rule or regulation section/subpart that applies for each emissions unit. Refer to IDAPA 58.01.01.213.01.c.

☒ Certification of Pre-Permit Construction Approval Application. The pre-permit construction approval application must be signed by the Responsible Official and must contain a certification signed by the Responsible Official. The certification must state that, based on information and belief formed after reasonable inquiry, the statements and information in the document are true, accurate, and complete. Refer to IDAPA 58.01.01.213.01.d and IDAPA 58.01.01.123.

☒ Submit the Pre-Construction Approval Application. Submit the pre-permit construction approval application to the following address:

Department of Environmental Quality
Air Quality Division
Stationary Source Program
1410 North Hilton
Boise, ID 83706-1255

jbr environmental consultants, inc. www.jbrenv.com
7669 W. Riverside Drive, Suite 101 • Boise, Idaho 83714 [P] 208.853.0883 [F] 208.853.0884

March 28, 2008

Air Quality Program Office - Application Processing
Department of Environmental Quality
1410 N. Hilton
Boise, ID 83706-1255

RE: Request for Facility Emission Cap

Dear DEQ Permit Writer:

JBR Environmental Consultants, Inc. is submitting on behalf of Hoku Scientific, Inc. a PTC application for construction and operation of a new polysilicon manufacturing facility. In accordance with IDAPA 58.01.01.176.01, Hoku requests a Facility Emissions Cap.

In accordance with the June 9, 2005 FEC white paper by the Workgroup Steering Committee, the following information must be provided:

(1) A proposed FEC and the basis for its calculation;
(2) Estimates of ambient concentrations; and
(3) Proposed monitoring and recordkeeping requirements.

These items are addressed in more detail below:

(1) A proposed FEC and the basis for its calculation

The proposed FEC limits are the potential to emit emission estimates included in the enclosed DEQ forms. The bases for the calculations are primarily engineering evaluations from existing sources, baghouse grain loadings, control efficiencies for process emissions, and AP-42 for combustion emissions. These emissions are the potential to emit that the facility will not exceed without any plant modification.

(2) Estimates of ambient concentrations

The ambient concentrations estimated with this application are expected to be worst case. Precise locations of some equipment and exact stack parameters are not known at this time but Hoku has submitted their best understanding of worst case stack and location characteristics in this application. Upon final determination of the equipment locations and stack characteristics, Hoku will prepare an "as-built" modeling report if necessary to ensure worst-case impacts under the permit are shown to not exceed any ambient air quality impact limits.

Throughout the term of the FEC permit, Hoku will maintain modeling demonstrations as necessary showing that permitted activities will not threaten any ambient air quality standards. The modeling reports will be prepared and maintained consistent with Idaho DEQ and FEC requirements.

(3) Proposed monitoring and recordkeeping requirements

According to the white paper the applicant must also identify proposed means for monitoring compliance with the FEC on a rolling 12 month consecutive basis. Monitoring methods can include continuous emissions monitors, material balance calculations, emissions calculations, and using approved emission factors and process information, alternative production or process limits, or other approved methods. Recordkeeping requirements must include proposed means to identify and track facility changes that increase emissions, such as the relocation of emission units or addition of new emission units. The applicant must also identify means to record the impact of the facility changes.

Hoku proposes to keep all monitoring and recordkeeping requirements as prescribed in the Permit to Construct P-2007.0075.

Please note that no new emission units are requested at this time for the FEC. Please feel free to contact myself at 208.853.0883 if you have any questions or need additional information.

Sincerely,

Daniel Heiser, P.E.

Daniel Heiser, P.E.
JBR Environmental Consultants, Inc.

cc: Karl Taft, Hoku Scientific

Enclosure: PTC Application Fee
PTC Application Forms
PTC Modeling Report
Electronic Modeling Files

Hoku Materials Public Announcement
Source: Idaho State Journal
Printed: Monday, March 24, 2008
Section: Legal Notices, page D6

POLYSILICON MANUFACTURING PLANT PLANS MEETING

Hoku Materials – will hold an informational meeting in accordance with Idaho regulations on April 4th at the Holiday Inn Pocatello off of Exit 71 on Interstate 15, in Pocatello, at 12 p.m.

The purpose of this meeting will be to discuss an air quality Permit to Construct application for building and operating up to a 4,000 metric-ton per year polysilicon manufacturing plant in Pocatello, Idaho.

March 24, 2008
LN14990

Pre-Permit Construction Approval Application

Hoku Materials, Inc.
Facility ID 005-00058

Prepared for:
Hoku Materials, Inc.
One Hoku Way
Pocatello, ID 83204

Prepared by:
JBR Environmental Consultants, Inc.
7669 West Riverside Drive, Suite 101
Boise, ID 83714

March 28, 2008

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Appendix C	PTC Application Forms
Appendix D	Modeling Report
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EXECUTIVE SUMMARY

Hoku Materials, Inc. proposes to build a new polysilicon production facility, in Pocatello, Idaho. The Pocatello facility will be a polysilicon production plant designed for 4,000 metric tons a year (Mtons/yr) of polysilicon production. This application is a request to increase production from 2,000 MT/yr, as permitted in PTC P-2007.0075, to 4,000 MT/yr.

Emission sources at Hoku will include metallurgical grade silicon storage, polysilicon processing, fuel combustion, and equipment and operation fugitives.

Hoku will have a controlled potential to emit (PTE) below 100 tons per year (tpy) for particulate matter (PM), particulate matter with less than ten microns in diameter (PM10), particulate matter less than 2.5 microns in diameter (PM2.5), oxides of nitrogen (NOx), sulfur dioxide (SO_2), volatile organic compounds (VOC), and carbon monoxide (CO). The facility will be a minor with respect to both Title V permitting and New Source Review. The plant boiler and hot oil heater will comply with NSPS Subpart Dc for natural gas firing.

1.0 PROCESS DESCRIPTION

1.1 Overview

Polysilicon is produced by a batch process where pure trichlorosilane (TCS) gas and hydrogen are combined in a number of reactors at around 2000 degrees Fahrenheit and the solid silicon released from the reaction is deposited onto a filament or rod inside the reactor. Over time the rod grows in diameter until the desired size is reached and then the online reactor is taken offline to recover the silicon rod which is packaged for sale. The deposition process is called chemical vapor deposition or CVD. Having multiple reactors allows the overall process to be a continuous process as a bank of reactors is always running while another bank is offline for polysilicon removal and reconditioning to accept feed again to begin the process over.

Production of polysilicon can be separated into four main processing functions as follows:

- Feed Preparation and Purification
- Polysilicon Production
- Polysilicon Product Handling
- Byproducts and Waste Treatment

1.2 Feed Preparation and Purification

Trichlorosilane (TCS) is made by reacting metallurgical grade silicon (MGS) with hydrogen chloride (HCl) in a fluid bed reactor with a very small amount of copper chloride catalyst that promotes the reaction. As well as making TCS, other chlorosilanes are produced in the reactor, the major one being silicon tetrachloride (STC). Metal chlorides are also formed from the impurities in the MGS feed. These chlorides are removed from the reactor product stream by cooling the stream and precipitating out these compounds which are sent to waste treatment.

The mixed chlorosilanes products from the fluid bed reactor are separated and purified. Removal of boron and phosphorous compounds is required and achieved by passing the stream through packed absorber beds. The main products produced are purified TCS and STC which are fed to the Polysilicon Production area.

1.3 Polysilicon Production

Purified TCS and hydrogen are fed into the polysilicon deposition reactors and they are heated by using electric current passed through the rods on which the polysilicon is deposited. At the high temperatures achieved TCS and hydrogen react and silicon and hydrogen chloride are the main products. The gas products containing hydrogen chloride, hydrogen and unreacted chlorosilanes are cooled and sent to a vent gas recovery system.

Once the rod of polysilicon has grown to the desired diameter (a process which takes approximately five days) the reactor is taken offline and the TCS feed is switched to a different deposition reactor. There are a total of 16 reactors for polysilicon deposition. Removal of polysilicon, cleaning and reloading takes approximately two days.

Purified STC is reacted with hydrogen in a set of hydrogenation reactors housed in the same area as the polysilicon reactors. The hydrogenation reactors are used to convert the STC into TCS. The products from these reactors are sent to the vent gas recovery system.

As part of the polysilicon production process, product sampling is conducted throughout the various stages of production. Laboratory sample products are treated in the lab scrubber system. Hoku will utilize a natural gas fired boiler and hot oil heater as well as a cooling tower to provide heating and cooling to various process equipment in all areas of the plant.

1.4 Polysilicon Product Handling

The U shaped rods of polysilicon grown in the deposition reactors are carefully removed from the reactors and transported to the product handling area. This area along with the reactor buildings are controlled environments to ensure no contamination occurs to the product. The polysilicon rods are broken into chunks and bagged. The bags are packaged and stored prior to shipping out to the end customers.

1.5 Byproduct and Waste Treatment

Exhaust gases from the polysilicon deposition reactors and the hydrogenation reactors are treated in the Vent Gas Recovery system. In this system Hydrogen, Hydrogen Chloride and non reacted chlorosilanes are recovered and returned to the appropriate processing unit for reuse. This step minimizes the needs for fresh feedstocks to be added to the process.

Products that are not recovered will be treated in the chlorosilane scrubber system to ensure all chlorosilanes are removed from the excess gas streams. All relief valves will also be routed to the relief vent scrubber system prior to atmospheric discharge.

Waste streams from the feed preparation system (containing metal chlorides) are processed in a metal chloride recovery system that recovers chlorosilanes in this stream. The remaining waste plus any streams containing hydrogen chloride are then sent to a neutralization process. Chlorosilane polymers from the polysilicon production process will also be routed to the neutralization area. Typically neutralization will be by lime and high level chloride wastes will then be discharged to an on site evaporation pond after solids removal. The solid waste is then land filled. Other aqueous waste streams with low levels of contaminants are also treated before release into the local municipal treatment facilities.

1.6 Equipment List

Included in Appendix B is a process flow diagram and scaled plot plan which identifies all equipment that is requested for pre-permit construction. Included in Appendix C are the PTC application forms which describe in detail all equipment that is requested for pre-permit construction. The manufacturer, model number and serial number have not been determined at this time. Hoku Materials intends to bid out the various types of equipment. After the manufacturers are selected the manufacturer, model number and serial number will be made available to Department representatives upon request.

2.0 REGULATORY APPLICABILITY

A review of state and local air quality regulations is provided in Table 2-1. Each regulation is described in the following sections. Included in Appendix C is the completed federal regulatory applicability PTC form.

Table 2-1. Regulatory Applicability Summary

Program Description		Regulatory Citation	Applicable
2.1	National Ambient Air Quality Standards (NAAQS)- (dispersion modeling)	40 CFR Part 50	NO (NAAQS not exceeded)
2.2	Title V Operating Permit	40 CFR Part 70	NO
2.3	Air Pollutants (NESHAPs)	40 CFR Parts 61, 63	NO
2.4	New Source Review (NSR)	40 CFR Part 52	NO (PSD not applicable)
2.5	New Source Performance Standards (NSPS)	40 CFR Part 60 Subpart Dc	YES
2.6	Acid Rain Requirements	40 CFR Parts 72–78	NO
2.7	Stratospheric Ozone Protection Requirements	40 CFR Part 82	NO
2.8	Risk Management Programs For Chemical Accidental Release Prevention	40 CFR Part 68	YES
2.9	State Rules		
2.9.1	Fuel Burning Equipment	IDAPA 58.01.01.676	YES
2.9.2	Particulate Matter	IDAPA 58.01.01.703	YES
2.9.3	Fugitive Dust Control	IDAPA 58.01.01.808	YES
2.9.4	Facility Emissions Cap	IDAPA 58.01.01.176	YES
2.9.5	Toxic Air Pollutants	IDAPA 58.01.01.585 and 586	YES

2.1 National Ambient Air Quality Standards (NAAQS)

Primary National Ambient Air Quality Standards (NAAQS) are identified in 40 CFR Part 50 and define levels of air quality, which the United States Environmental Protection Agency (USEPA) deems necessary to protect the public health. Secondary NAAQS define levels of air quality, which the USEPA judges necessary to protect public welfare from any known, or anticipated, adverse effects of a pollutant. Examples of public welfare include protecting wildlife, buildings, national monuments, vegetation, visibility, and property values from degradation due to excessive emissions of criteria pollutants.

Specific standards for the following pollutants have been promulgated by USEPA: PM2.5, PM10, SO_2, NOx, CO, ozone, and lead. The Hoku polysilicon plant will emit PM, PM10, PM2.5, SO_2, NOx, CO, and VOCs, a precursor to ozone. The facility is a minor source with respect to PSD and Title V as it will not exceed any major source thresholds.

2.2 Title V (Part 70) Operating Permit

Title V of the Clean Air Act (CAA) created the federal operating permit program. These permitting requirements are codified in 40 CFR Part 70. The operating permits required under these rules are often referred to as "Part 70 operating permits." These permits are required for major sources with a PTE (considering federally enforceable limitations) greater than 100 tpy for any criteria pollutant, 25 tpy for all hazardous air pollutants (HAPs) in aggregate, or 10 tpy of any single HAP. Hoku will qualify as a minor source and will be exempt from a Title V operating permit.

2.3 National Emission Standards for Hazardous Air Pollutants (NESHAPs)

Two sets of National Emissions Standards for Hazardous Air Pollutants (NESHAPs) may potentially apply to the Hoku polysilicon facility. The first NESHAP regulations were developed under the auspices of the original CAA. These standards are codified in 40 CFR Part 61, and address a limited number of pollutants and industries. 40 CFR Part 61 regulations do not apply to this planned facility.

Newer regulations are codified in 40 CFR Part 63 under the authority of the 1990 Clean Air Act Amendments (CAAA). These standards regulate HAP emissions from specific source categories and typically affect only major sources of HAPs. Part 63 regulations are frequently called Maximum Achievable Control Technology (MACT) standards. Major HAP sources have the PTE 10 tpy or more of any single HAP or 25 tpy or more of all combined HAP emissions. At the Hoku polysilicon facility, potential emissions of individual HAPs will be less than 10 tpy and combined HAP emissions will be less than 25 tpy. Therefore, the facility is not subject to 40 CFR Part 63.

2.4 New Source Review (NSR) Requirements

Bannock County is designated as an attainment area for all criteria pollutants. Therefore, the prevention of significant deterioration (PSD) regulations codified in 40 CFR Part 52 could potentially apply to the proposed facility. The PSD rule applies to: (1) a new major source that has the potential to emit 100 tons per year or more for any criteria pollutant for a facility that is one of the 28 industrial source categories listed in 40 CFR § 52.21(b)(1)(i)(a); or (2) a new major source that has the potential to emit 250 tons per year or more if the facility is not on the list of industrial source categories; or (3) a modification to an existing major source that results in a net emission increase greater than a PSD significant emission rate as specified in 40 CFR § 52.21 (b)(23)(i); or (4) a modification to an existing minor source that is major in itself. The facility's PTE does not exceed the major source threshold for any criteria pollutants. Therefore, Hoku is not subject to PSD regulations.

2.5 New Source Performance Standards (NSPS)

New Source Performance Standards (NSPS) in 40 CFR Part 60 are applicable to new, modified, or reconstructed stationary sources that meet or exceed specified applicability thresholds. The facility boiler and hot oil heater are also subject to NSPS Subpart Dc and will comply by burning natural gas only.

2.5.1 Standards of Performance Steam Generating Units

Subpart Dc of the NSPS, "Standards of Performance for Small Industrial, Commercial, and Institutional Steam Generating Units" applies to the boiler and hot oil heater at the facility because the total heat input is between 10 and 100 million British thermal units per hour (MMBtu/hr). The boiler and hot oil heater are not subject to any emission limitations in Subpart Dc because they will burn natural gas only. The boiler and hot oil heater will, however, be subject to the monitoring and recordkeeping requirements identified in NSPS Subpart Dc.

2.6 Acid Rain Requirements

The acid rain requirements codified in 40 CFR Parts 72-78 apply only to utilities and other facilities that combust fossil fuel (mainly coal) and generate electricity for wholesale or retail sale. The proposed facility will not produce electrical power for sale. Therefore, the facility is not subject to the acid rain provisions and will not require an acid rain permit.

2.7 Stratospheric Ozone Protection Requirements

Protection of the stratospheric ozone layer was promulgated as part of the CAAA. Sections 601-618 limit activities that deplete stratospheric ozone. The stratospheric ozone protection requirements may apply to this facility. Use of some fire equipment could potentially release an ozone depleting substance known as halons. Release of halons during equipment maintenance is unlawful. If the fire protection equipment is subject to stratospheric ozone protection program requirements in 40 CFR Part 82, a third-party contractor will be hired by Hoku to maintain the fire protection equipment in accordance with the stratospheric ozone protection requirements.

2.8 Risk Management Programs for Chemical Accidental Release Prevention

The facility is subject to the Chemical Accidental Release Prevention Program and will develop and implement a Risk Management Plan (RMP). Facilities that produce, process, store, or use any regulated toxic or flammable substance in excess of the thresholds listed in 40 CFR Part 68 must develop a RMP. The facility will use anhydrous hydrogen chloride, trichlorosilane and silicon tetrachloride. Storage will exceed the applicability thresholds. A RMP will be prepared and submitted, as required by 40 CFR 68.

2.9 State Rules

The Idaho Administrative Procedure Act (IDAPA) promulgates several emissions regulations that apply to Hoku in addition to those listed above.

2.9.1 Fuel Burning Equipment – Particulate Matter

IDAPA 58.01.01.676 restricts any fuel burning source of 10 MMBtu or greater to limit the PM released from combustion to 0.015 gr/dscf for gas fuel and 0.05 gr/dscf for liquid fuels. The boiler and hot oil heater will each comply by burning natural gas only.

2.9.2 Particulate Matter

IDAPA 58.01.01.703 promulgates restrictions on PM for the entire facility based on process weight. Hoku will comply with this rule by using baghouse filters and dust control practices to limit the facility's emission.

2.9.3 Fugitive Dust Control

IDAPA 58.01.01.808 promulgates the implementation of a fugitive dust control system for any plant that releases fugitive particulate matter. Hoku will comply by paving all facility roads and implementing a dust suppression plan.

2.9.4 Facility Emissions Cap

IDAPA 58.01.01.176 establishes procedures to obtain a Facility Emissions Cap (FEC) for stationary sources or facilities. Hoku is requesting an FEC with the submittal of this PTC application.

2.9.5 Toxic Air Pollutants

IDAPA 58.01.01.585 and 586 establishes requirements for compliance with toxic air pollutants. Hoku demonstrates compliance with the standards.

3.0 EMISSION SUMMARY

A summary of the potential emissions for the facility is presented in Table 3-1. Emission calculations have been completed for: PM, PM10, SO_2, NOx, VOCs, CO, and both individual and combined hazardous air pollutants. Detailed emission calculations are included in Appendix A. Permit application forms are included as Appendix C.

Table 3-1. Hoku Materials Polysilicon Production PTE

PM (tpy)	PM_{10} (tpy)	SO_2 (tpy)	NOx (tpy)	VOC (tpy)	CO (tpy)	Individual HAP (tpy)	Combined HAP (tpy)
24.86	24.86	6.13	60.35	5.84	46.33	5.83	6.72

APPENDIX A

EMISSION CALCULATIONS

Hoku Scientific, Inc.

Polysilicon Processing Facility Pocatello, Idaho

Emission Inventory

Emisison Unit ID	Source	Pollutant															
		PM		PM-10		VOC		SO_2		NO_X		CO		Lead		HCl	
		lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr
1	Boiler	0.40	1.74	0.40	1.74	0.29	1.26	0.031	0.14	5.24	22.943	4.40	19.27	2.62E-05	1.15E-04		
2	Hot Oil Heater	0.40	1.74	0.40	1.74	0.29	1.26	0.031	0.14	5.24	22.94	4.40	19.27	2.62E-05	1.15E-04		
3	M.G. Silicon Bin Vent	0.14	0.60	0.14	0.60												
4	M.G. Silicon Primary Hopper	0.03	0.15	0.03	0.15												
5	M.G. Silicon Secondary Hopper	0.03	0.11	0.03	0.11												
6	Lime Storage Silo	0.21	0.90	0.21	0.90												
7	Cooling Tower	1.47	6.4333	1.47	6.43												
8	Lab Scrubber	0.16	0.70	0.16	0.70			0.16	0.70	0.96	4.20					0.01	0.03
9	Chlorosilane Scrubber	1.83	8.01	1.83	8.01											0.37	1.60
10	Relief Vent Scrubber	0.73	3.20	0.73	3.20											0.18	0.80
11	Emergency Generator	3.28	0.82	3.28	0.82	3.31	0.82	18.97	4.74	112.56	28.14	25.80	6.45				
12	Fire Water Pump	1.76	0.44	1.76	0.44	1.98	0.49	1.64	0.41	24.80	6.20	5.34	1.34				
13	Fugitive Emissions					0.46	2.00									0.78	3.40
TOTAL		**10.43**	**24.86**	**10.43**	**24.86**	**6.32**	**5.84**	**20.83**	**6.13**	**148.80**	**84.43**	**39.94**	**46.33**	**0.00**	**0.00**	**1.33**	**5.83**

Boiler No. 1 - Natural Gas

Boiler Capacity MMBtu/hr
55.0

Maximum[b] scf/hr
52,381

Maximum hrs/yr
8,760

Criteria Pollutant Estimates, <100 MMBTU/hr (AP-42, Tables 1.4-1 and 1.4-2, 9/98)

	Pollutant					
	SO_2	NO_X[c]	CO	PM/PM-10[a]	VOC	Lead
Emission Factor, lb/10^6 scf	0.6	100	84	7.6	5.5	0.0005
Emissions, lb/hr	0.0314	5.24	4.40	0.40	0.2881	2.62E-05
Emissions, ton/yr	0.1377	22.943	19.272	1.744	1.262	1.15E-04

Notes:

[a]PM factor is sum of filterable PM plus condensable PM

[b]Heat content of natural gas = 1,050 BTU/scf

[c]Boiler is controlled with low NOx burners and flue gas recirculation

Hot Oil Heater - Natural Gas

Heater Capacity MMBtu/hr
55.0

Maximum[b] scf/hr
52,381

Maximum hrs/yr
8,760

Criteria Pollutant Estimates, <100 MMBTU/hr (AP-42, Tables 1.4-1 and 1.4-2, 9/98)

	Pollutant					
	SO_2	NO_X[c]	CO	PM/PM-10[a]	VOC	Lead
Emission Factor, $lb/10^6$ scf	0.6	100	84	7.6	5.5	0.0005
Emissions, lb/hr	0.0314	5.24	4.40	0.40	0.29	2.62E-05
Emissions, ton/yr	0.14	22.94	19.27	1.74	1.26	1.15E-04

Notes:

[a]PM factor is sum of filterable PM plus condensable PM.

[b]Heat content of natural gas = 1,050 BTU/scf;

[c]Boiler is controlled with low NOx burners and flue gas recirculation

Diesel Emergency Generator

Generator Capacity Kw
3,500

Generator Capacity Hp
4,690

Generator Capacity MMBtu/hr
11.94

Maximum hrs/yr
500

Criteria Pollutant Estimates, >600 Hp (AP-42, Tables 3.4-1 and 3.4-2, 10/96)

	Pollutant				
	SO_2[b]	NO_X	CO	PM/PM-10[a]	VOC
Emission Factor, lb/hp-hr	4.05E-03	0.024	5.50E-03	7.00E-04	7.05E-04
Emissions, lb/hr No control	18.9711	112.6	25.7950	3.2830	3.3065
Emissions, ton/yr No control	4.743	28.140	6.449	0.821	0.83

Notes:

[a]PM factor is sum of filterable PM plus condensable PM.

[b]Assumes distillate fuel sulfur content of 0.5%

Diesel Fired Water Pump

Generator Capacity Hp
800

Generator Capacity MMBtu/hr
2.04

Maximum hrs/yr
500

Criteria Pollutant Estimates, <600 Hp (AP-42, Tables 3.3-1 and 3.3-2, 10/96)

	Pollutant				
	SO_2	NO_X	CO	PM/PM-10[a]	VOC
Emission Factor, lb/hp-hr	2.05E-03	0.031	6.68E-03	2.20E-03	2.47E-03
Emissions, lb/hr No control	1.6400	24.8000	5.3440	1.7600	1.9760
Emissions, ton/yr No control	0.410	6.200	1.3360	0.440	0.49

Notes:
[a]PM factor is sum of filterable PM plus condensable PM.

M.G. Silicon Process Emissions

	Capacity ft^3	Exhaust Flow acfm	Control Efficiency gr/dscf[b]	PM/PM-10 Emission Rate lb/hr	PM/PM-10 Emission Rate tpy[a]	Silicon Emission Rate lb/hr	Silicon Emission Rate tpy[a]
M.G. Silicon Bin Vent	250	800	0.02	0.137	0.601	0.14	0.60
M.G. Silicon Primary Feed Hopper	15	200	0.02	0.034	0.150	0.03	0.15
M.G. Silicon Secondary Feed Hopper	20	150	0.02	0.026	0.113	0.03	0.11
Total				**0.20**	**0.86**	**0.20**	**0.86**

[a]PM-10/PM emissions are in the form of Silicon.

[b]Baghouse and fabric filter control efficiency

Lime Storage Process Emissions

	Capacity ft^3	Exhaust Flow acfm	Control Efficiency gr/dscf[b]	PM/PM-10 Emission Rate lb/hr	PM/PM-10 Emission Rate tpy[a]	Calcium Carbonate Emission Rate lb/hr	Calcium Carbonate Emission Rate tpy
Lime Storage Silo	900	1200	0.02	0.21	0.90	0.21	0.901
Total				**0.21**	**0.90**	**0.21**	**0.90**

[a]PM-10/PM emissions are in the form of Calcium Carbonate.
[b]Baghouse control efficiency

Cooling Tower Emissions

	Total Liquid Drift Factor (lb/1000 gal)[b]	TDS Content Fraction	Emission Factor (lb/1000 gal)	Evaporation Rate[c] (gal/hr)	PM/PM-10 (lb/hr)	PM/PM-10 (tpy)
Cooling Tower	1.7	0.012000	0.020400	72,000	1.47	6.43
Total					**1.47**	**6.43**

[a]PM-10 emission factor assumed to be equal to PM emission factor.

[b]AP-42 Table 13.4-1 Total liquid drift for induced draft tower

Scrubber Emissions

	PM/PM-10 Emission Rate lb/hr	PM/PM-10 Emission Rate tpy[b]	SOx Emission Rate lb/hr	SOx Emission Rate tpy[b]	NOx Emission Rate lb/hr	NOx Emission Rate tpy[b]	HCl Emission Rate lb/hr	HCl Emission Rate tpy[b]	HNO3 Emission Rate lb/hr	HNO3 Emission Rate tpy[b]	HF Emission Rate lb/hr	HF Emission Rate tpy[b]
Lab Scrubber[a]	0.16	0.70	0.16	0.70	0.96	4.20	0.007	0.03	0.005	0.02	0.005	0.02
Chlorosilane Scrubber[a]	1.83	8.01					0.37	1.60				
Relief Vent Scrubber[a]	0.73	3.20					0.18	0.80				
Total	**2.72**	**11.91**	**0.16**	**0.70**	**0.96**	**4.20**	**0.55**	**2.43**	**0.00**	**0.02**	**0.00**	**0.02**

[a]Based on emissions from 4,000 Mton/yr polysilicon plant
[b]Annual production =8,760

Fugitive Emission Calculations

Source	VOC (lb/hr)	VOC (tpy)	HCl (lb/hr)	HCl (tpy)
Valves and Fittings[a]			0.78	3.40
Cleaning[a]	0.46	2.0		

[a]Based on emissions from 1,800 Mton/yr polysilicon plant and revised to reflect actual operations at Pocatello facility.

Grain Loading Calculations

Source	PM lb/hr	Flow rate, dscf/m @3% O_2	Grain Loading, g/dscf @ 3%	Grain Loading Standard, grain/dscf	Meet Grain Loading Standard?
Boiler	0.40	20,000	0.0023	0.015	Yes
Hot Oil Heater	0.40	20,000	0.0023	0.015	Yes

Process Weight Calculations

Source	Process Weight, lb/hr	E, Emission Limit, lb/hr	PM Emissions, lb/hr	Meet E?
Silicon Storage Bin	2,000	4.304	0.14	Yes
Silicon Feed Hopper	2,000	4.304	0.03	Yes
Silicon Lock Hopper	2,000	4.304	0.03	Yes
Lime Storage System	800	2.484	0.21	Yes
Cooling Tower	600,480	30.621	1.47	Yes
Lab Scrubber	300	1.379	0.16	Yes
Chlorosilane Scrubber	600	2.090	1.83	Yes
Relief Vent Scrubber	600	2.090	0.73	Yes

$E = 0.045*(PW)^{0.60}$ E= Emission Limit < 9,250 lb/hr PW

$E = 1.10*(PW)^{0.25}$ E= Emission Limit ≥ 9,250 lb/hr PW

TOXIC AIR POLLUTANT CALCULATIONS

TABLE 1. BOILER #1 - NON-CARCINOGENS
NATURAL GAS

Pollutant	Emission Factor (lb/1,000,000 scf)	Emissions (lb/hr)	Emissions (tons/yr)	Emissions (grams/sec)
Barium	4.4E-03	2.3E-04	1.0E-03	2.9E-05
Chromium	1.4E-03	7.3E-05	3.2E-04	9.2E-06
Cobalt	8.4E-05	4.4E-06	1.9E-05	5.5E-07
Copper	8.5E-04	4.5E-05	2.0E-04	5.6E-06
Hexane	1.8E+00	9.4E-02	4.1E-01	1.2E-02
Manganese	3.8E-04	2.0E-05	8.7E-05	2.5E-06
Mercury	2.6E-04	1.4E-05	6.0E-05	1.7E-06
Molybdenum	1.1E-03	5.8E-05	2.5E-04	7.3E-06
Naphthalene	6.1E-04	3.2E-05	1.4E-04	4.0E-06
Pentane	2.6E+00	1.4E-01	6.0E-01	1.7E-02
Phosphorous	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Selenium	2.4E-05	1.3E-06	5.5E-06	1.6E-07
Toluene	3.4E-03	1.8E-04	7.8E-04	2.2E-05
o-Xylene	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Vanadium	2.3E-03	1.2E-04	5.3E-04	1.5E-05
Zinc	2.9E-02	1.5E-03	6.7E-03	1.9E-04

TABLE 2. BOILER #1 - CARCINOGENS
NATURAL GAS

Pollutant	Emission Factor (lb/1,000,000 scf)	Emissions (lb/hr)	Emissions (tons/yr)	Emissions (grams/sec)
Arsenic	2.0E-04	1.0E-05	4.6E-05	1.3E-06
Benzene	2.1E-03	1.1E-04	4.8E-04	1.4E-05
Beryllium	1.2E-05	6.3E-07	2.8E-06	7.9E-08
Cadmium	1.1E-03	5.8E-05	2.5E-04	7.3E-06
Formaldehyde	7.5E-02	3.9E-03	1.7E-02	5.0E-04
Nickel	2.1E-03	1.1E-04	4.8E-04	1.4E-05
Benzo(a)pyrene	1.2E-06	6.3E-08	2.8E-07	7.9E-09
Benz(a)anthracene	1.8E-06	9.4E-08	4.1E-07	1.2E-08
Benzo(b)fluoranthene	1.8E-06	9.4E-08	4.1E-07	1.2E-08
Benzo(k)fluoranthene	1.8E-06	9.4E-08	4.1E-07	1.2E-08
Chrysene	1.8E-06	9.4E-08	4.1E-07	1.2E-08
Dibenzo(a,h)anthracene	1.2E-06	6.3E-08	2.8E-07	7.9E-09
Indeno(1,2,3-cd)pyrene	1.8E-06	9.4E-08	4.1E-07	1.2E-08
Total PAHs	1.1E-05	6.0E-07	2.6E-06	7.5E-08

Notes: Emissions based on boiler operating at maximum rate of 55 MMBTU/hr.
Assumed 1,050 BTU/scf heat content of natural gas.
Emissions based on 8,760 hours/year of operation.

Source: AP-42 Tables 1.4-3 and 1.4-4, 7/98.

TOXIC AIR POLLUTANT CALCULATIONS

TABLE 3. HOT OIL HEATER - NON-CARCINOGENS
NATURAL GAS

Pollutant	Emission Factor (lb/1,000,000 scf)	Emissions (lb/hr)	Emissions (tons/yr)	Emissions (grams/sec)
Barium	4.4E-03	2.3E-04	1.0E-03	2.9E-05
Chromium	1.4E-03	7.3E-05	3.2E-04	9.2E-06
Cobalt	8.4E-05	4.4E-06	1.9E-05	5.5E-07
Copper	8.5E-04	4.5E-05	2.0E-04	5.6E-06
Hexane	1.8E+00	9.4E-02	4.1E-01	1.2E-02
Manganese	3.8E-04	2.0E-05	8.7E-05	2.5E-06
Mercury	2.6E-04	1.4E-05	6.0E-05	1.7E-06
Molybdenum	1.1E-03	5.8E-05	2.5E-04	7.3E-06
Naphthalene	6.1E-04	3.2E-05	1.4E-04	4.0E-06
Pentane	2.6E+00	1.4E-01	6.0E-01	1.7E-02
Phosphorous	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Selenium	2.4E-05	1.3E-06	5.5E-06	1.6E-07
Toluene	3.4E-03	1.8E-04	7.8E-04	2.2E-05
o-Xylene	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Vanadium	2.3E-03	1.2E-04	5.3E-04	1.5E-05
Zinc	2.9E-02	1.5E-03	6.7E-03	1.9E-04

TABLE 4. HOT OIL HEATER - CARCINOGENS
NATURAL GAS

Pollutant	Emission Factor (lb/1,000,000 scf)	Emissions (lb/hr)	Emissions (tons/yr)	Emissions (grams/sec)
Arsenic	2.0E-04	1.0E-05	4.6E-05	1.3E-06
Benzene	2.1E-03	1.1E-04	4.8E-04	1.4E-05
Beryllium	1.2E-05	6.3E-07	2.8E-06	7.9E-08
Cadmium	1.1E-03	5.8E-05	2.5E-04	7.3E-06
Formaldehyde	7.5E-02	3.9E-03	1.7E-02	5.0E-04
Nickel	2.1E-03	1.1E-04	4.8E-04	1.4E-05
Benzo(a)pyrene	1.2E-06	6.3E-08	2.8E-07	7.9E-09
Benz(a)anthracene	1.8E-06	9.4E-08	4.1E-07	1.2E-08
Benzo(b)fluoranthene	1.8E-06	9.4E-08	4.1E-07	1.2E-08
Benzo(k)fluoranthene	1.8E-06	9.4E-08	4.1E-07	1.2E-08
Chrysene	1.8E-06	9.4E-08	4.1E-07	1.2E-08
Dibenzo(a,h)anthracene	1.2E-06	6.3E-08	2.8E-07	7.9E-09
Indeno(1,2,3-cd)pyrene	1.8E-06	9.4E-08	4.1E-07	1.2E-08
Total PAHs	1.1E-05	6.0E-07	2.6E-06	7.5E-08

Notes: Emissions based on hot oil heater operating at maximum rate of 55 MMBTU/hr.
Assumed 1,050 BTU/scf heat content of natural gas.
Emissions based on 8,760 hours/year of operation.

Source: AP-42 Tables 1.4-3 and 1.4-4, 7/98.

TOXIC AIR POLLUTANT CALCULATIONS

TABLE 5. EMERGENCY GENERATOR- NON-CARCINOGENS DIESEL FUEL

Pollutant	Emission Factor (lb/MMBtu)	Emissions (lb/hr)	Emissions (tons/yr)	Emissions (grams/sec)
Acrolein	7.88E-06	9.41E-05	2.35E-05	1.19E-05
Barium	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Chromium	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Cobalt	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Copper	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Hexane	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Manganese	0.00E+00	0.00E+00	0.00E+00	0.00.E+00
Mercury	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Moybdenum	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Naphthalene	1.30E-04	1.55E-03	3.88E-04	1.96E-04
Pentane	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Phosphorous	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Selenium	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Toluene	2.81E-04	3.36E-03	8.39E-04	4.23E-04
o-Xylene	1.93E-04	2.30E-03	5.76E-04	2.90E-04
Vanadium	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Zinc	0.00E+00	0.00E+00	0.00E+00	0.00E+00

TABLE 6. EMERGENCY GENERATOR - CARCINOGENS DIESEL FUEL

Pollutant	Emission Factor (lb/MMBtu)	Emissions (lb/hr)	Emissions (tons/yr)	Emissions (grams/sec)
Arsenic	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Benzene	7.76.E-04	9.27E-03	2.32E-03	1.17E-03
Beryllium	0.00E+00	0.00E+00	0.00E+00	0.E+00
Cadmium	0.00E+00	0.00E+00	0.00E+00	0.E+00
Formaldehyde	7.89E-05	9.42E-04	2.36E-04	1.19E-04
Nickel	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Benzo(a)pyrene	2.57E-07	3.07E-06	7.67E-07	3.87E-07
Benz(a)anthracene	6.22E-07	7.43E-06	1.86E-06	9.36E-07
Benzo(b)fluoranthene	1.11E-06	1.33E-05	3.31E-06	1.67E-06
Benzo(k)fluoranthene	2.18E-07	2.60E-06	6.51E-07	3.28E-07
Chrysene	1.53E-06	1.83E-05	4.57E-06	2.30E-06
Dibenzo(a,h)anthracene	3.46E-07	4.13E-06	1.03E-06	5.21E-07
Indeno(1,2,3-cd)pyrene	4.14E-07	4.94E-06	1.24E-06	6.23E-07
Total PAHs	4.50E-06	5.37E-05	1.34E-05	6.77E-06

Notes: * Emission factor units in pounds per MMBTU.
Emission estimates represent maximum emissions based on burning diesel fuel and based on AP-42 Tables 3.4-3 and 3.4-4.
Emissions based on generator operating with maximum rating of 11.9 MMBtu/hour.
Emissions based on 500 hours/year of operation.

TOXIC AIR POLLUTANT CALCULATIONS
TABLE 7. FIRE PUMP- NON-CARCINOGENS
DIESEL FUEL

Pollutant	Emission Factor (lb/MMBtu)	Emissions (lb/hr)	Emissions (tons/yr)	Emissions (grams/sec)
Acrolein	7.88E-06	1.61E-05	4.01E-06	2.02E-06
Barium	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Chromium	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Cobalt	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Copper	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Hexane	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Manganese	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Mercury	0.00E+00	0.00E+00	0.00E+00	0.00.E+00
Moybdenum	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Naphthalene	1.30E-04	2.65E-04	6.62E-05	3.34E-05
Pentane	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Phosphorous	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Selenium	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Toluene	2.81E-04	5.72E-04	1.43E-04	7.21E-05
o-Xylene	1.93E-04	3.93E-04	9.83E-05	4.95E-05
Vanadium	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Zinc	0.00E+00	0.00E+00	0.00E+00	0.00E+00

TABLE 8. FIRE PUMP - CARCINOGENS
DIESEL FUEL

Pollutant	Emission Factor (lb/MMBtu)	Emissions (lb/hr)	Emissions (tons/yr)	Emissions (grams/sec)
Arsenic	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Benzene	7.76.E-04	1.58E-03	3.95E-04	1.99E-04
Beryllium	0.00E+00	0.00E+00	0.00E+00	0.E+00
Cadmium	0.00E+00	0.00E+00	0.00E+00	0.E+00
Formaldehyde	7.89E-05	1.61E-04	4.02E-05	2.03E-05
Nickel	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Benzo(a)pyrene	2.57E-07	5.24E-07	1.31E-07	6.60E-08
Benz(a)anthracene	6.22E-07	1.27E-06	3.17E-07	1.60E-07
Benzo(b)fluoranthene	1.11E-06	2.26E-06	5.65E-07	2.85E-07
Benzo(k)fluoranthene	2.18E-07	4.44E-07	1.11E-07	5.60E-08
Chrysene	1.53E-06	3.12E-06	7.79E-07	3.93E-07
Dibenzo(a,h)anthracene	3.46E-07	7.05E-07	1.76E-07	8.88E-08
Indeno(1,2,3-cd)pyrene	4.14E-07	8.43E-07	2.11E-07	1.06E-07
Total PAHs	4.50E-06	9.16E-06	2.29E-06	1.15E-06

Notes: * Emission factor units in pounds per MMBTU.

Emission estimates represent maximum emissions based on burning diesel fuel and based on AP-42 Tables 3.4-3 and 3.4-4.

Emissions based on fire pump operating with maximum rating of 2.73 MMBtu/hour.

Emissions based on 500 hours/year of operation.

TOXIC AIR POLLUTANT EMISSION INVENTORY

TABLE 1. NON-CARCINOGENS

Pollutant	Max. Hourly Emissions (lb/hr)	Screening Level (lb/hr)	Modeling? (Y/N)	Emissions (tons/yr)
Acrolein	1.10E-04	1.7E-02	N	2.75E-05
Barium	4.61E-04	3.3E-02	N	2.02E-03
Chromium	1.47E-04	3.3E-02	N	6.42E-04
Cobalt	8.80E-06	3.3E-03	N	3.85E-05
Copper	8.90E-05	6.7E-02	N	3.90E-04
Hexane	1.89E-01	1.2E+01	N	8.26E-01
Manganese	3.98E-05	3.33E-01	N	1.74E-04
Mercury	2.72E-05	3.E-03	N	1.19E-04
Molybdenum	1.15E-04	6.67E-01	N	5.05E-04
Naphthalene	1.88E-03	3.33E+00	N	7.34E-04
Pentane	2.72E-01	1.18E+02	N	1.19E+00
Selenium	2.51E-06	1.3E-02	N	1.10E-05
Toluene	4.28E-03	2.5E+01	N	2.54E-03
o-Xylene	2.70E-03	2.9E+01	N	6.74E-04
Vanadium	2.41E-04	3.0E-03	N	1.06E-03
Zinc	3.04E-03	6.7E-01	N	1.33E-02
Silicon	1.97E-01	6.7E-01	N	8.63E-01
Calcium Carbonate	2.06E-01	6.7E-01	N	9.01E-01
Hydrogen Chloride	1.33E+00	5.0E-02	Y	5.83E+00
Nitric Acid	4.57E-03	3.3E-01	N	2.00E-02

TABLE 2. CARCINOGENS

Pollutant	Max. Hourly Emissions (lb/hr)	Screening Level (lb/hr)	Modeling? (Y/N)	Emissions (tons/yr)
Arsenic	2.10E-05	1.5E-06	Y	9.18E-05
Benzene	1.11E-02	8.0E-04	Y	3.68E-03
Beryllium	1.26E-06	2.8E-05	N	5.51E-06
Cadmium	1.15E-04	3.7E-06	Y	5.05E-04
Formaldehyde	8.96E-03	5.1E-04	Y	3.47E-02
Nickel	2.20E-04	2.7E-05	Y	9.64E-04
Benzo(a)pyrene	3.72E-06	2.0E-06	Y	1.45E-06
Benz(a)anthracene	8.88E-06	NA	NA	3.00E-06
Benzo(b)fluoranthene	1.57E-05	NA	NA	4.71E-06
Benzo(k)fluoranthene	3.24E-06	NA	NA	1.59E-06
Chrysene	2.16E-05	NA	NA	6.17E-06
Dibenzo(a,h)anthracene	4.96E-06	NA	NA	1.76E-06
Indeno(1,2,3-cd)pyrene	5.98E-06	NA	NA	2.27E-06
Total PAHs	6.41E-05	2.0E-06	Y	2.09E-05

HAPs Inventory

Pollutant	Emissions (tons/yr)	
Arsenic	9.18E-05	
Acrolein	2.75E-05	
Benzene	3.68E-03	
Beryllium	5.51E-06	
Cadmium	5.05E-04	
Formaldehyde	3.47E-02	
Chromium	6.42E-04	
Lead	2.29E-04	
Mercury	1.19E-04	
Naphthalene	7.34E-04	
Nickel	9.64E-04	
Xylene	6.74E-04	
Selenium	1.10E-05	
Toluene	2.54E-03	
Dichlorobenzene	1.26E-04	
Hexane	8.26E-01	
Hydrogen Chloride	5.83E+00	
Hydrogen Fluoride	2.00E-02	
Total	**6.72E+00**	

Note: Emission Factors for lead, POM, dichlorobenzene and hexane are as follows (i.e., for those HAPs not listed above):

Dichlorobenzene	1.20E-03	lb/MMscf
Lead	5.00E-04	lb/MMscf